

CLAIMS

1        **1. A balancing apparatus for rotating bodies, comprising:**

2        - means for rotatably supporting a rotating body,

3        - at least two balancing rings disposed on said rotating body in axial side by  
4 side relationship with each other and coaxial with said rotating body, said rings  
5 being each unbalanced and rotatable with said rotating body and further  
6 susceptible of assuming different angular positions relative to said rotating body,

7        - detecting means for detecting unbalance of said rotating body and for  
8 detecting said angular positions of said rings relative to said rotating body, and

9        - positioning means operatively connected with, and responsive to, said  
10 detecting means for carrying out an angular rotation between said rings and said  
11 rotating body to bring said rings to a relative angular position corresponding to a  
12 balance state of said rotating body, wherein said positioning means comprises

13        - positioning members selectively engageable with said rings in a stopped  
14 position of said rotating body, and

15        - driving means for selectively causing a relative angular rotation of said  
16 rings and said rotating body during mutual engagement of said positioning  
17 members and said rings.

1        **2. An apparatus as claimed in claim 1, further comprising friction means**  
2 between said rings and said rotating body for preventing angular shiftings of said  
3 rings relative to said rotating body during disengagement of said rings from said  
4 positioning members.

1        **3. An apparatus as claimed in claim 1, wherein said rings each have a**  
2 driving toothing and wherein said positioning members comprise at least one  
3 positioning gear to be selectively and in succession engaged with said toothing

4 of each of said rings, said driving means comprising a servomotor for setting  
5 said positioning gear in rotation when said positioning gear is in engagement  
6 with a respective one of said rings and said rotating body is in said stopped  
7 position.

1       4. An apparatus as claimed in claim 1, wherein said positioning members  
2 are carried by a support structure movable parallel to a rotation axis of said  
3 rotating body at least between a first and a second operating position, in which  
4 said positioning members are respectively engaged with a respective one of said  
5 rings.

1       5. An apparatus as claimed in claim 4, wherein said support structure  
2 comprises a slide slidably mounted on a support post fastened to a table of a  
3 machine tool.

1       6. An apparatus as claimed in claim 1, wherein said positioning members  
2 comprise means for locking said rings, and said driving means comprises a  
3 servomotor for angularly rotating said rotating body, said servomotor being  
4 actuatable when said locking means selectively engages said rings.

1       7. An apparatus as claimed in claim 6, wherein said rings have respective  
2 notches and said locking means comprises locking elements adapted to  
3 selectively penetrate in said notches of said rings.

1       8. An apparatus as claimed in claim 7, wherein said notches are formed in  
2 a circumferential surface of said rings and wherein said locking elements are  
3 radially and selectively movable relative to said rings between a non-operating  
4 position, in which said locking elements are disengaged from said notches, and  
5 an operating position, in which said locking elements are in engagement with  
6 said notches.

1       **9.** An apparatus as claimed in claim 6, wherein said rings are arranged on  
2 a shaft of a tool-carrier rotated by a spindle of a machine tool, and wherein said  
3 locking means is carried by a fixed structure of said machine tool.

1       **10.** An apparatus as claimed in claim 6, wherein said rings are arranged on  
2 a shaft of a tool-carrier rotated by a spindle of a machine tool, and wherein said  
3 locking means is disposed on a structure carried by a support of said spindle.

1       **11.** An apparatus as claimed in claim 10, wherein said locking means is  
2 disposed on a slide slidable parallel to a rotation axis of said spindle.

1       **12.** An apparatus as claimed in claim 6, wherein said rings are arranged on  
2 a shaft of a tool-carrier rotated by a spindle of a balancing machine, and wherein  
3 said locking means is carried by a fixed structure of said balancing machine.

1       **13.** An apparatus as claimed in claim 12, wherein said fixed structure  
2 extends parallel to said rotation axis of said spindle and wherein said locking  
3 means is supported slidably along said fixed structure.

1       **14.** An apparatus as claimed in claim 1, wherein said rings each have an  
2 unbalance milling.

1       **15.** An apparatus as claimed in claim 1, wherein said rings each have at  
2 least one hole and wherein a gauged mass of a material having a specific weight  
3 different from the specific weight of the material of said rings is arranged in said  
4 at least one hole.

1       **16.** An apparatus as claimed in claim 1, further comprising adjustable  
2 friction means between said rings and said rotating body.